Claims

We claim:

1. A method for classifying data into multiple classes, the data in each class having a class-conditional probability distribution, comprising:

projecting the class-conditional probability distributions of measured data into a likelihood space; and

classifying the projected class-conditional probability distributions in the likelihood space according to a discriminant classifier in likelihood space.

2. The method of claim 1, in which the projecting is non-linear.

3. The method of claim 1, in which the data are discrete.

4. The method of claim 1, in which the data are continuous.

5. The method of claim 1, further comprising:

estimating the projected class-conditional probability distributions.

6. The method of claim 5, further comprising:

applying a likelihood maximization process to training data to obtain the estimated class-conditional probability distributions.

7. The method of claim 5, in which $P_X(X|C_1)$, $P_X(X|C_2)$,... $P_X(X|C_N)$ represent true distributions of the data from each of N classes, $\boldsymbol{X}$ represents a

random vector, the X within the parentheses represents a specific instance of the random vector, and P represents a probability that the random vector $\boldsymbol{X}$ takes the value X, given that the value X belongs to class C_i, and estimates of true distributions are $\tilde{P}_X(X|C_1)$, $\tilde{P}_X(X|C_2)$,... $\tilde{P}_X(X|C_N)$, and the likelihood projection of a vector $\boldsymbol{X}$ is an operation $L_N(X)$, resulting in an N-dimensional likelihood vector Y_X, and a component of the likelihood vector Y_X is $Y_X = L_N(X) = [\log(\tilde{P}_X(X|C_1)) \ \log(\tilde{P}_X(X|C_2)) \ \ldots \ \log(\tilde{P}_X(X|C_N))]$.

8. The method of claim 1, in which the data represent a speech signal.

9. The method of claim 1, in which the data represent a visual signal.

10. The method of claim 1, in which the discriminant classifier is a linear discriminant with a unit slope.

11. The method of claim 1, in which the classifier is a quadratic discriminant.

12. The method of claim 1, in which the classifier is a logistic regression.

13. The method of claim 1, in which the classifier in the likelihood space is a distribution-based classifier.

14. The method of claim 1, in which the projecting distribution is a Gaussian function.

15. The method of claim 1 in which the projecting distribution is a mixture of Gaussian functions.

16. The method of claim 1, in which the projecting is invertible.